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10/561,739	02/07/2006	Esther Breuning	09931-00052-US	5924
23416 7590 08/14/2009 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER				
WILSON, MICHAEL H				
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1794				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/561,739

**Applicant(s)**

BREUNING ET AL.

**Examiner**

MICHAEL WILSON

**Art Unit**

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-14, 17-29 and 32-39 is/are pending in the application.
- 4a) Of the above claim(s) 5-7, 17-21, 25-29, 32, 33, 35-37 and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-4, 8-14, 22-24, 34 and 38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 15 June, 2009 has been entered.
2. It is noted that applicants' amendment filed 27 April, 2009 which was previously not entered for the reasons set forth in the Advisory Action mailed 27 May, 2009 has now been entered. The following action is based on this now entered amendment.

### ***Response to Amendment***

3. This Office action is in response to Applicant's amendment filed 15 June, 2009, which amends claims 3, 5, 7, and 14.

Claims 2-14, 17-29, and 32-39 are pending.

4. Claims 5-7, 17-21, 25-29, 32, 33, 35-37, and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 29 October, 2008.

***Claim Objections***

5. Claim 14 is objected to because of the following informalities:

The symbol for the linking group in instant formula (II) has been amended to R";  
R in line 19 of the claim should be replaced with R".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 2-4, 8, 11-13, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Roberts et al. (US 200/0062930 A1).

Regarding claims 2 and 3, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163].

Regarding claim 4, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of a conjugated polymer, which contains 7.5% (0.1\*75) or less of a bridged carbazole unit of instant formula (I) ([0086]-[0087], structure XCII), and 0.05-10% by weight of at least one triplet emitter [0163].

Regarding claim 8, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position and is a bicarbazole unit with the structure of instant formula (IV) ([0086]-[0087], structure XCII).

Regarding claim 11, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylaminines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 22, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules, which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 23, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl).

Regarding claim 24, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 4 above and in view of Maxted et al. (WO 03/074628 A).

Regarding claim 9, Roberts et al disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position ([0086]-[0087], structure XCII). However the reference does not disclose the bicarbazole unit bound via the 3, 3'-position.

Maxted et al. teach a similar charge transporting polymer comprising a bicarbazole unit (page 9, compound KLCBP1). The reference teaches the bicarbazole may be bound via the 3, 3'-position.

It would be obvious to one of ordinary skill in the art at the time of the invention to connect the bicarbazole unit of Roberts via the 3, 3'-position, as taught by Maxted et al., in the polymer of Roberts et al. One of ordinary skill would reasonably expect such a polymer to have similar properties and be suitable for the same purpose given that Maxted et al. 3, 3'-bound bicarbazole units as suitable for charge transfer polymers (page 9, first full paragraph), suitable for use in electroluminescent devices (abstract). One of ordinary skill would be motivated by a desire to optimize the physical properties of the polymer as the specific connectivity of a polymer is known to directly affect the physical properties of the material.

11. Claims 3, 4, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn et al. (US 2002/0093005 A1) in view of Thompson et al. (US 2003/0017361 A1).

Regarding claims 3, 4, and 10, Sohn et al. disclose a conjugated polymer comprising a carbazole unit (abstract). Where n is two or more the polymer forms a bicarbazole unit meeting instant formula(I) wherein R is a stilbenyl system (two benzenes with a vinyl group between), and the bicarbazole is bound to the polymer via the R bridge. The reference also discloses that the polymer is emissive and charge transporting [0008]. However the reference does not explicitly disclose a triplet emitting mixed with the polymer.

Thompson et al. teaches using phosphorescent compounds a host compound in electroluminescent devices (abstract). The reference teaches using a phosphorescent compound can improve luminescent efficiency [0016].

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the phosphorescent compound of Thompson et al. with the polymer layer of Sohn et al. One of ordinary skill would reasonably expect such a combination to be suitable given that Thompson teaches the host compound may be an emissive charge transporting compound [0026]. One of ordinary skill would be motivated by a desire to improve luminescent efficiency.



12. Claims 14 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1).

Regarding claims 14 and 34, Roberts et al. disclose all the claim limitations as set forth above. Additionally the reference discloses bicarbazole units with the structure of instant formula (IV) ([0086]-[0087], structure XCII). The reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). However the reference does not explicitly disclose bicarbazole units with bridging groups which are not two benzene groups.

Hu et al. teach bicarbazole compounds for use in electroluminescent devices (abstract). The reference teaches that the linking groups between the carbazoles may be one of several different aryl and heteroaryl groups including phenyl, biphenyl, triphenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene (column 4, line 59 to column 5, line 60). The reference recognized the equivalency of the groups by teaching then together as suitable linking units.

In view of Hu et al.'s recognition that biphenyl, phenyl, 9,10-anthracene, diphenylethylene, 2,6-naphthylene and thiophene are equivalent and interchangeable, it would have been obvious to one of ordinary skill in the art to substitute biphenyl with phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene or thiophene and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally

because Roberts et al. discloses that a bicarbazole with a biphenyl linker as suitable for the polymer of Roberts et al. et al. one of ordinary skill in the art would reasonably expect other monomeric equivalents of bicarbazole with a biphenyl linker to also be suitable.

13. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Treacher et al. (WO 02/077060 A) English equivalent (US 2004/0135131 A1) relied upon.

Regarding claim 38, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). However the reference does not explicitly disclose spirofluorene as a suitable copolymer unit.

Treacher et al. teach conjugated polymers for use in organic electroluminescent devices (abstract). The reference teaches fluorene and spirobifluorene copolymers as suitable for polymers used in charge transporting or luminescent layers ([0134]-[0135]).

The reference teaches that using both fluorene and spirobifluorene units in a polymer results in higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life ([0034]-[0037]).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the fluorene and spirobifluorene copolymer units of Treacher et al. in the polymer of Roberts et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Treacher teaches both units as suitable for polymers in organic electroluminescent devices and that Roberts et al discloses fluorene as suitable. One of ordinary skill would be motivated by a desire to have higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life.

### ***Response to Arguments***

14. Applicant's arguments filed 27 April, 2009 have been fully considered but they are not persuasive.

Applicants argue that a biphenyl group no longer is within the scope of the present claims. While the examiner agrees what a biphenyl no longer reads on the claims as a single aromatic ring system, the group does read on the claims as two aromatic ring systems, i.e. two benzene groups. R as defined in the present claims may be an aromatic ring system or "2 to 5 of these systems."

The amendment to claim 14 however does effectively remove a biphenyl group from the scope of the claim. Therefore the 102(e) rejection of claim 14 is overcome,

however under further consideration claim 14 is rejected under 103(a) as unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1). Hu et al. teaches numerous linking groups (R ) as suitable replacements for a biphenyl group in bicarbazole structures, as set forth above.

Applicant's arguments regarding the 103(a) rejections of record have been fully considered by are not persuasive. Applicants argue that the statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. However the examiner notes that both motivation to combine and the reasons one of ordinary skill in the art would reasonably expect success have previously been articulated in the rejections of record. Therefore the rejections do not merely make the conclusory statement, but articulate reasoning with rational underpinning to support the conclusion of obviousness.

Applicants also argue that the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection; and asserts that the mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention obvious unless the prior art suggested the desirability of such modification. Thus, applicants argue that that the examiner used impermissible hindsight reasoning. In

response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The rejections of record only use knowledge which was within the level of ordinary skill at the time the claimed invention was made with motivation to combine coming explicitly or implicitly from the cited references and not from applicant's specification. Therefore the rejections of record are not based on impermissible hindsight reasoning.

### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

MHW